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COMPUTER SCIENCE

NEWSLETTER

No. 96

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GENERAL NEWS

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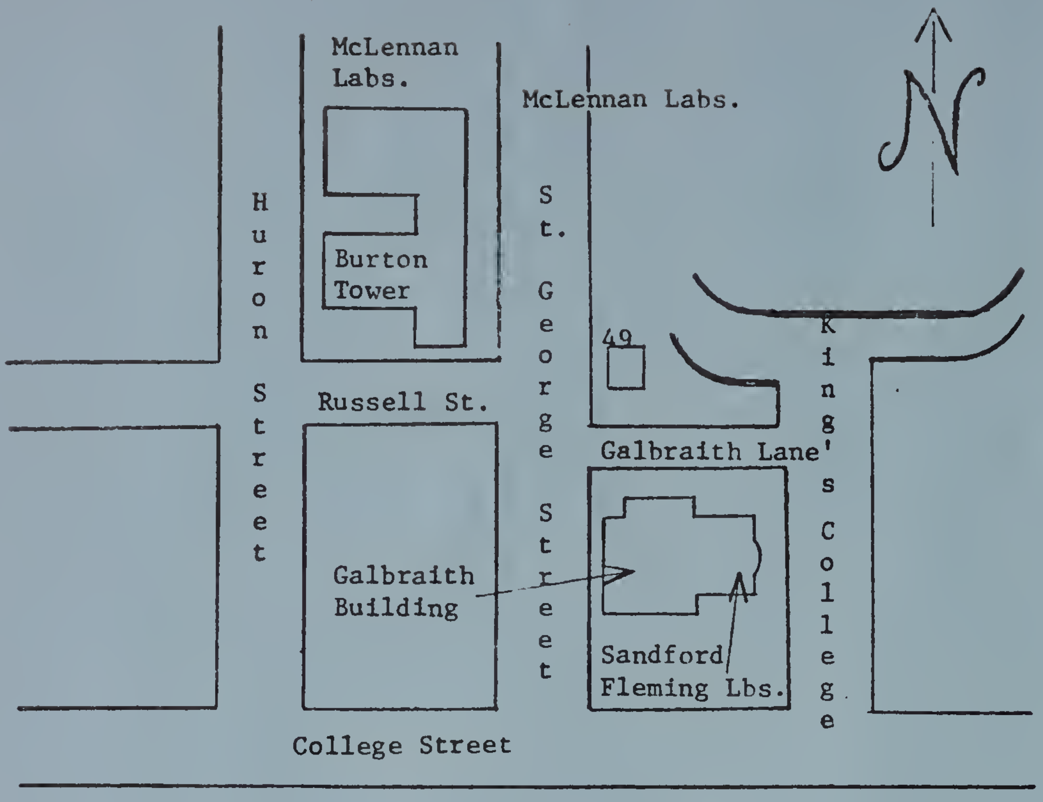
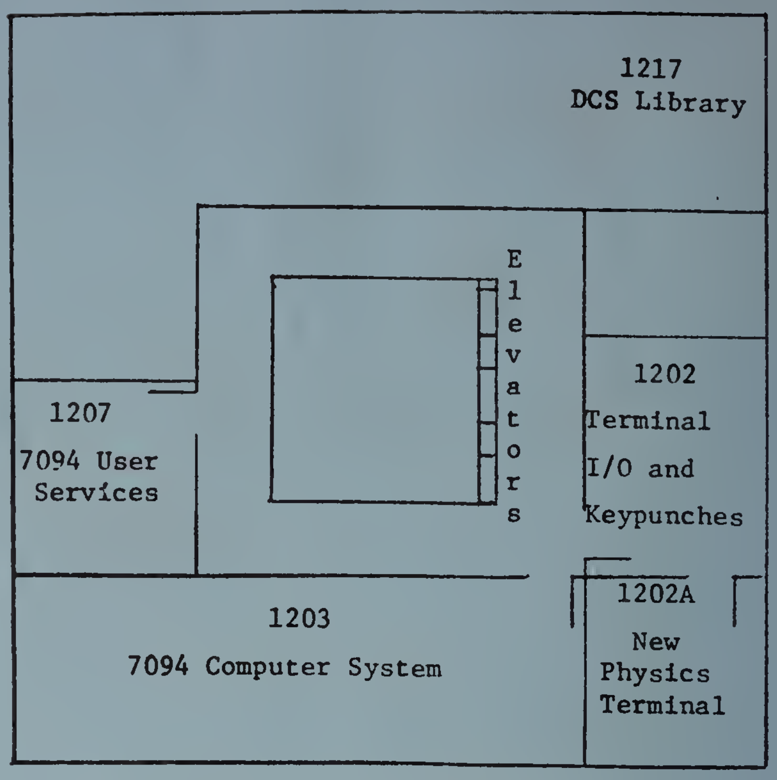
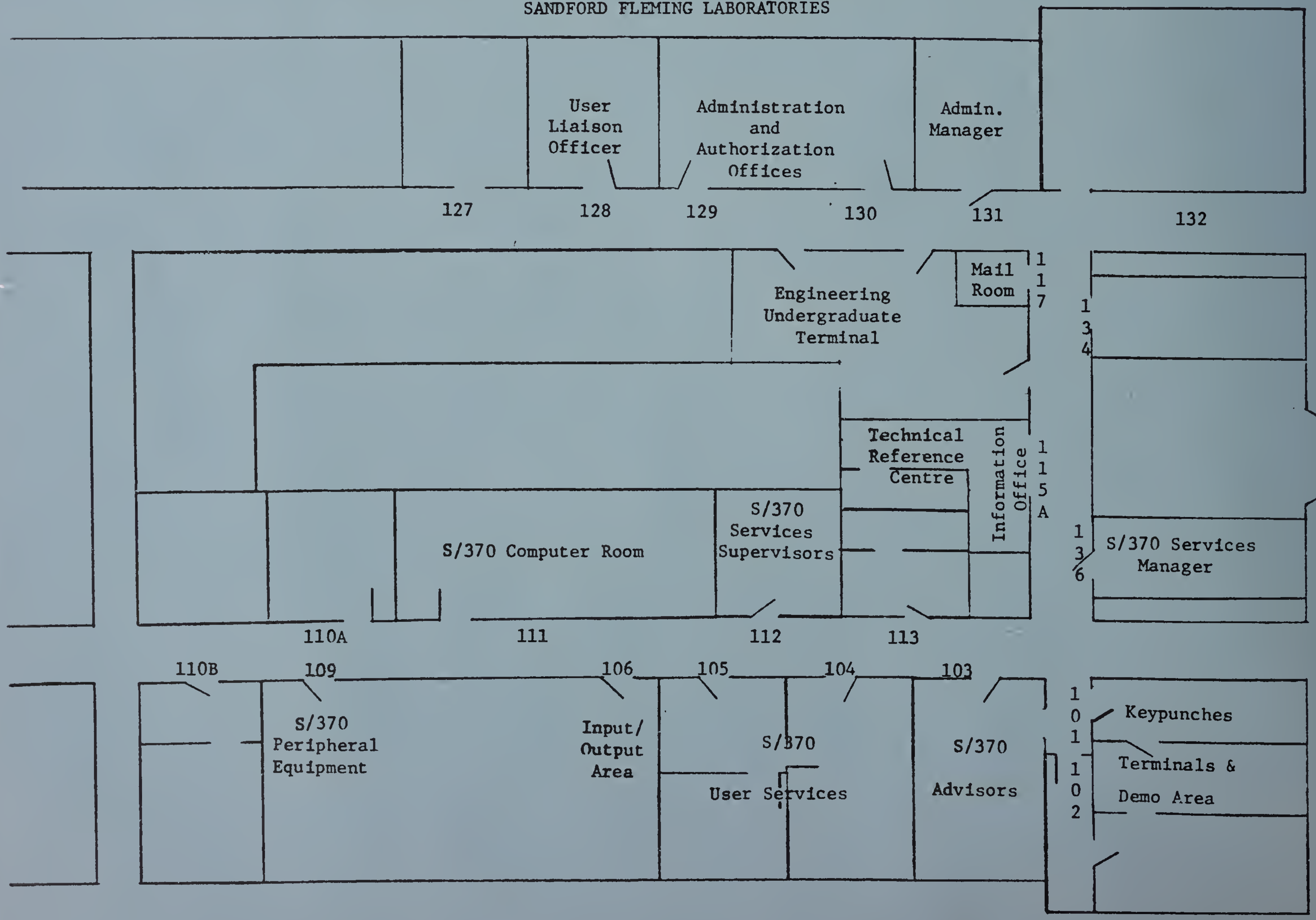




FLOOR PLAN: 12th Floor Burton Tower

FLOOR PLAN: UNIVERSITY OF TORONTO COMPUTER CENTRE

SANDFORD FLEMING LABORATORIES



LET'S START THE NEW YEAR...

C. A. Ford

Our Computer Centre has a reputation for changing things around at the end of every calendar year. Last year it was the brand new System/370-165. This year the most visible change is in the assignment of office space. See the inside front cover for a revised layout of our floor plan.

The Director's offices have been moved to the house at 49 St. George Street. This has been necessitated by continued increases in the floor space needed to support the growing activity on the System/370-165. A number of our staff have moved from 49 St. George Street into the Sandford Fleming Laboratories to be closer to the system. Other personnel have been relocated within Sandford Fleming in order to make the best possible use of the limited floor space.

Bill Greene, our Liaison Officer, has now been able to expand the services of the Information Office to include a Reference Centre for technical material.

The new slab doors in Sandford Fleming are the result of an edict from the Fire Marshall's office requiring doors with a 2 hour rating. There seems no escape from them. Users are requested to disregard the blank stonewall effect of the new doors and remember that the same friendly, helpful Computer Centre staff still reside behind them.

The Director, John Wilson, the Assistant Director, Al Ford, and their staff now occupy the third floor at 49 St. George Street. We urge you to visit us in our charming new offices. Bring us your ideas, problems or comments upon how the Computer Centre may help you with your future computing projects.

CIPS ANNUAL SEMINAR

The Canadian Information Processing Society, Toronto Chapter, has announced their annual seminar. This year's topic is: "Minicomputers and Their Uses". The seminar is scheduled to be held at the Inn on the Park, Tuesday, February 13, 1973 from 9:00 a.m. through 5:00 p.m.

The seminar will be of interest and useful to both executives of small businesses and to the data processing professional.

For further information contact:

Mr. Dave Crouse,
Erindale College,
University of Toronto.
Telephone: 828-5311

THE FOURTH ONTARIO UNIVERSITIES COMPUTING CONFERENCE February 22-23

C. A. Ford

We hear from Dave Macey of the Office of Computer Coordination that the 1973 Ontario Universities Computing Conference promises to be a most interesting event. Registrations have been received from throughout Canada and North America.

The final papers to be presented are strongly application oriented in theme. Organized workshops are also being scheduled. The workshops hold promise of interest especially for Computer Centre management and technical staff.

For more information direct your enquiries to:

Mr. David S. Macey,
Office of Computer Coordination,
Council of Ontario Universities,
102 Bloor St. W.,
Toronto, Ontario.
M5S 1M8.
Telephone: (416) 920-6865

SHARE XL, DENVER, COLORADO - MARCH 4 - 9, 1973

The next semi-annual SHARE conference will be held in Denver, Colorado in early March. We hope to have received copies of the preliminary agenda by the time this newsletter reaches your hands. University of Toronto computer users are entitled to participate in these conferences. Our University will be represented in the agenda.

Preliminary information may be obtained from the Secretary of UTCC, Ms. Ann Herring, in Room 301, 49 St. George Street.

CANADIAN COMPUTER CONFERENCE SESSION 73

The Canadian Information Processing Society has put out a call for papers for the computer conference to be held in Edmonton, Alberta, June 20-22, 1973. The session will feature two main streams of papers, one on applications and the other on software. There will also be a special interest session on computer science education sponsored by the Computer Science Association. A number of workshop sessions will also be held concurrently.

Watch our bulletin boards for copies of the advanced information or write to the Canadian Information Processing Society, P. O. Box 1881, Edmonton, Alta. T5J-2P3.

RANDOM NUMBER PACKAGE AVAILABLE

C. A. Ford

Professor J. C. Ogilvie has advised us that a random number package called "Super-Duper" can be obtained by writing to Dr. G. Marsagha, Director of the School of Computer Science, McGill University. The source program is a 500 card deck mostly in ASSEMBLER. Further information can be obtained from Professor Ogilvie at 928-6089.

PERSONNEL CHANGES

J. Schick

There have been more changes in the staff at the Computer Centre during the last four weeks.

Recent terminations of employment have come from Phoebe Armstrong, Glenna Ayerst, Debi Cook, Russ Mayhew and Judith Munro. We wish good luck to all these people in their new endeavours and thank them very much for their contribution to the Centre.

New staff includes Denise Jackson and Donald Heacock taking operating positions in System/370 Services. Marilyn Hall is the new System/370 secretary. Joy Hisey is the new switchboard operator working for Administration. We welcome back Gord Brown who has returned to work for the 7094 group.

Edith Kovacs has transferred from System/370 to the 7094 to take over Phoebe Armstrong's position. Pam Kellett replaces Glenna Ayerst as Administrative secretary. Karen Roth joins UTCC, taking over Pam Kellett's position with Ann Herring.

PLANNING FOR THE FUTURE

C. A. Ford

Our System/370-165 is still a very new computer. It possesses reserves of processing power which will be tapped increasingly as time passes. But, it has been rendered a bit "old hat" by the IBM "Advanced Function" announcement of 1972. The senior UTCC staff therefore has been holding regular meetings to help visualize and plan for the future.

Typical questions to be answered are: how much more will the batch processing load grow? how would the S/370 perform with more real memory? with virtual storage? how useful and efficient will a virtual machine facility be? is virtual storage vital to the future? or full-function time sharing processors? or much much more APL support? what do the users need that we haven't even considered?

Guesses are necessary. Educated guesses. We must scheme and propose systems for your consideration. Your ideas and outlines of your requirements are needed by us to help us build systems to serve your needs effectively for your objectives. Phone, write or drop in. We will be looking for you.

DEPARTMENT OF COMPUTER SCIENCE NEWS

C. Phillips

January Visitor

P. Bernstein

The Department of Computer Science was host to Professor C.A.R. Hoare of the Department of Computer Science, University of Belfast during the first two weeks of the term. The formal schedule of his visit provided Professor Hoare with an opportunity to present the following lectures:

Colloquia
- "Parallel Programming"
- "Data Representation"

Theoretical Aspects Seminars
- "Axiomatic Properties of Program Structures"
- "Review of Axiomatic Properties of Data Structures"

Computer System Seminars
- "The Design of a Paging System".

On the informal side, Professor Hoare arranged to meet with several small groups of faculty and graduate students to discuss their current research activities. Some of the projects discussed were Project Sue: Monitors, Multiplexing and Pre-emption; Language Design; and System Correctness.

There were both long and short spur-of-the moment conversations during his stay at the University of Toronto. It was an enjoyable and profitable two weeks for members of the faculty, students and Computer Systems Research Group personnel. Thank you, Professor Hoare, for your time and ideas, both so freely shared.

Leave of Absence

Professor T.E. Hull, Chairman of the Department will take a partial sabbatical during the first half of this year. He will continue to teach his undergraduate course in Numerical Algebra, and will devote much of his free time to writing.

Professor E.V. Swenson, Associate Chairman, will become the acting Chairman during this time and will direct the administrative functions of the department.

High School Science Saturdays

The two Saturday programs held late in the fall were most successful. One thousand, four hundred young people interested in the physical sciences were able to visit the University of Toronto and gain some insight into various ways of pursuing their interests. Many teachers accompanied their students. We hope they had an interesting and profitable day.

The Computer Research Facility provided a demonstration of their equipment and the computing services available. Students interested in either Engineering or Computer Science (or both) chose this tour. Thanks to Krishna Patniak and Dennis Smith for their interesting presentations.

NEW ACQUISITIONS IN THE DCS LIBRARY

Advances in computers.
1972, v. 12

Andrews, H. C.
Introduction to mathematical techniques in pattern recognition.
New York, Wiley-Interscience, 1972.

Coddington, L.
Quick COBOL.

Computer Personnel Research Conference.
Proceedings of the 4th (1966), 6th, 7th, 8th and 9th (1971) Conferences.
Sponsored by ACM SIG CPR.

Comtre Corporation.
Operating systems survey.
Princeton, N. J., Auerbach, 1971.

Courant Computer Science Symposium, 1st, New York, 1970.
Debugging techniques in large systems, ed. by R. Rustin.
Englewood Cliffs, N.J., Prentice-Hall, 1971.

Courant Computer Science Symposium, 4th, New York, 1971.
Algorithm specification, ed. by R. Rustin.
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Freund, John E.
A model elementary statistics. 3d ed.
Englewood Cliffs, N.J., Prentice-Hall, 1967.

Germain, Clarence B.
PL/I for the IBM 360
Englewood Cliffs, N.J., Prentice-Hall, 1972.

Griswold,R.E.
The macro implementation of SNOBOL4: a case study
of machine-independent software/development.
San Francisco, W. H. Freeman, 1972.

Householder, A.S.
Lectures on numerical algebra.
Buffalo, N. Y., Math. Assoc. of America, 1972.

Joint Computer Conference.
Proceedings of the 1972 Fall Joint Computer
Conference (v.41, pts. I and II).

Knoll, M.
Storage tubes and their basic principles.
New York, Wiley, 1952.

Liu, Chung L.
Topics in combinatorial mathematics.
Buffalo, N. Y., Math Assoc. of America, 1972.

Massey, L.D.
EDP feasibility analysis.
Braintree, Mass., D.H. Mark Pub. Co. 1968.

Mitchell, G.P. and Willmott, A.J.
Programming a computer in Atlas Autocode.
Manchester, University Press, 1965.

Nashelsky, L.
Introduction to digital computer technology.
New York, Wiley, 1972.

Pall, G. A.
Introduction to scientific computing.
New York, Appleton-Century-Crofts, 1971.

Pettit, J. M.
Electronic switching, timing, and pulse circuits.
New York, McGraw-Hill, 1959.

Sanders, D. H.
Computers in business: an introduction.
New York, McGraw-Hill, 1972.

Starke, P.H.
Abstract automata.
Amsterdam, North-Holland, 1972.

Symposium on the Application of Computers to the
Problems of Urban Society, 6th, 1971.
Papers.

Weisman, H. M.
Information systems, services, and centers.
New York, Wiley, 1972.

Youngs, Edward A.
Error-proneness in programming.
Chapel Hill, University of North Carolina, 1970.
(PhD thesis).

SYSTEM/370 RELIABILITY

J. Lees

UPTIME PERCENTAGES

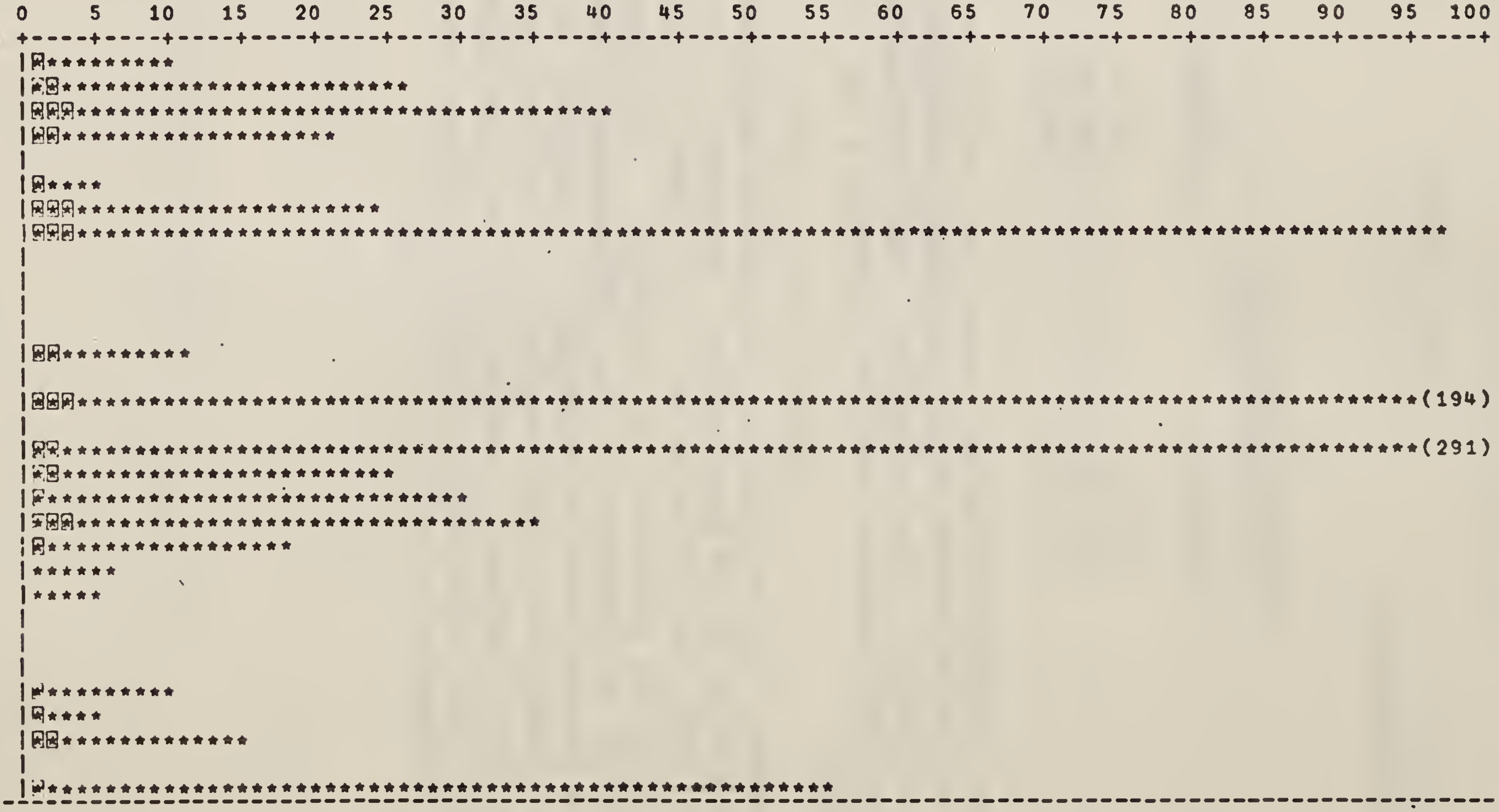
SERVICE	NOVEMBER	DECEMBER
S/370	97.3%	96.7%
CRJE	97.1%	96.9%
HSJS	95.9%	94.1%

As the December/November comparison indicates, the percentage of uptime of the total scheduled production time decreased slightly. The scheduled time of December was approximately 4000 minutes less than November's due to the holiday season.

On December 9, 97 minutes of downtime was caused by faulty electronics in the main memory. December 11 the EUT reader was down for 130 minutes. On December 14 the ASUT reader for HSJS was down for 210 minutes. Core problems again occurred on December 15 when 194 minutes of downtime occurred. A channel error on December 17 resulted in 291 minutes of downtime. CRJE was down for 105 minutes on December 18 due to hardware problems in the conversion of CRJE to the 3330 disk packs. Hardware problems (powering up) caused 55 minutes of downtime on December 31.

DOWNTIME REPORT ON S370 FOR DEC '72

DAY	RELOADS	DOWNTIME
1	1	10
2	2	26
3	3	40
4	2	21
5	0	0
6	1	5
7	3	24
8	3	97
9	0	0
10	0	0
11	0	0
12	0	0
13	2	11
14	0	0
15	3	194
16	0	0
17	2	291
18	2	25
19	1	30
20	3	35
21	1	18
22	0	6
23	0	5
24	0	0
25	(CENTRE CLOSED)	
26	0	0
27	1	10
28	1	5
29	2	15
30	0	0
31	1	55



STATISTICS:

```
    TOTAL TIME DOWN (MIN) .....    923 AVG. PER DAY  30.8
    TOTAL NUMBER OF RELOADS ...     34 AVG. PER DAY   1.1
```

DOWNTIMES (IN MINUTES) ARE SHOWN AS ASTERISKS E.G. *************

RELOADS REFERS TO THE NUMBER OF RE-IPL'S REQUIRED DUE TO SYSTEM FAILURES AND ARE SHOWN AS RECTANGLES E.G. ⊓⊓⊓⊓

```
                                DOWNTIME REPORT ON CRJE FOR DEC '72

-----------------------------------------------------------------------------------------------------------------------------------
|
|
|DAY  RELOADS  DOWNTIME      0    5    10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
|===========================  +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1     1        22         |□*********************
|  2     2        26         |□□************************
|  3     3        40         |□□□*************************************
|  4     3        34         |□□□*******************************
|  5     0         5         |*****
|  6     1        10         |□*********
|  7     3        26         |□□□***********************
|  8     3        97         |□□□**********************************************************************************************
|  9     0         0         |
| 10     0         0         |
| 11     0        13         |*************
| 12     0         0         |
| 13     0         6         |******
| 14     0         0         |
| 15     3       194         |□□□*************************************************************************************************(194)
| 16     0         0         |
| 17     2       291         |□□**************************************************************************************************(291)
| 18     1       105         |□***************************************************************************************************(105)
| 19     1        30         |□*****************************
| 20     2        20         |□□******************
| 21     0         0         |
| 22     0         6         |******
| 23     0         5         |*****
| 24     0         0         |
| 25   ( CENTRE CLOSED )     |
| 26     0         0         |
| 27     0        11         |***********
| 28     0         0         |
| 29     1        10         |□*********
| 30     0         0         |
| 31     1        55         |□******************************************************
-----------------------------------------------------------------------------------------------------------------------------------


STATISTICS:

   TOTAL TIME DOWN (MIN) .....  1006 AVG. PER DAY  33.5
   TOTAL NUMBER OF RELOADS ...    27 AVG. PER DAY   0.9


                                DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. *************

                                RELOADS REFERS TO THE NUMBER OF TIMES
                                CRJE   HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. □□□□
```

```
                         DOWNTIME REPORT ON HSJS FOR DEC '72

-------------------------------------------------------------------------------------------------------------------------------------
|
|
|DAY  RELOADS  DOWNTIME       0    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95  100
|=========================    +----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
|  1        1          10     |⊠*********
|  2        2          26     |⊠⊠************************
|  3        3          40     |⊠⊠⊠*************************************
|  4        3          21     |⊠⊠⊠******************
|  5        0           0     |
|  6        1           5     |⊠****
|  7        3          24     |⊠⊠⊠*********************
|  8        3          97     |⊠⊠⊠**********************************************************************************************
|  9        0           0     |
| 10        0           0     |
| 11        0         130     |****************************************************************************************************(130)
| 12        0           0     |
| 13        1           6     |⊠*****
| 14        0         210     |****************************************************************************************************(210)
| 15        3         194     |⊠⊠⊠*************************************************************************************************(194)
| 16        0           0     |
| 17        2         291     |⊠⊠**************************************************************************************************(291)
| 18        1          15     |⊠**************
| 19        1          30     |⊠*****************************
| 20        2          20     |⊠⊠******************
| 21        0           0     |
| 22        0           6     |******
| 23        0           5     |*****
| 24        0           0     |
| 25      ( CENTRE CLOSED )   |
| 26        0           0     |
| 27        0           0     |
| 28        0           0     |
| 29        1          10     |⊠*********
| 30        0           0     |
| 31        1          55     |⊠******************************************************
-------------------------------------------------------------------------------------------------------------------------------------


 STATISTICS:

    TOTAL TIME DOWN (MIN) .....  1195 AVG. PER DAY  39.8
    TOTAL NUMBER OF RELOADS ...    28 AVG. PER DAY   0.9


                          DOWNTIMES ( IN MINUTES ) ARE SHOWN AS ASTERISKS E.G. **************

                        * RELOADS REFERS TO THE NUMBER OF TIMES THE HIGH-SPEED-JOB-STREAM
                          MONITOR HAD TO BE RE-STARTED AND ARE SHOWN AS RECTANGLES E.G. □□□□
```

CREDIT REQUESTS...S/370

C. A. Ford

One tenth of one percent of all jobs seems to be the level of activity for credit requests which we must strive to better. The table below shows the data for the last quarter of 1972.

We may predict a bump in the figure for January, however. The introduction of the new 3420 1600 b.p.i. tape drives has been a source of conversion problems. Our policy in such instances is to "do what is correct by the user", not to "minimize the number of claims". Users with tape conversion troubles should avail themselves fully of S/370 Users' Service support. Meanwhile, we continue to work on Policy No. 1... "reduce the causes for claims".

	OCTOBER	NOVEMBER	DECEMBER	TOTALS
HARDWARE	10	20	7	37
SOFTWARE	28	26	24	78
HUMAN	6	13	9	28
TOTAL	44	59	40	143
NUMBER OF JOBS	42526	49165	39827	131518
% OF JOBS	0.10%	0.12%	0.10%	0.11%

S/370 APPLICATIONS SOFTWARE SUPPORT

W. Hayes

The following software changes have been effected for users of Application Software. Documentation for any of the items mentioned below is available through the Information Office.

Optimization Methods Library

OPTISEP

This integrated subroutine package, which was developed at McMaster University by J. N. Siddall, permits the solution of unconstrained optimization problems by a variety of methods. A descriptive entry for each subroutine available will apppear in an update to Section 3.7 of USERBOOK.

Numerical Method Library

IMSL

Various subroutines from the package have been added to our library. The areas of application involved are:

Interpolation, Approximation and Smoothing
Zeros and Extrema
Differentiation
Integration
Linear Algebraic Equations

A descriptive entry for each subroutine available will appear in an update to Section 3.7 of USERBOOK.

TWO USER AIDS - PROGLOOK AND OVERLAY

H. C. Kugel

Although they will be defined as updates to the USERBOOK, UTCC users should be aware of two powerful tools currently available.

One has been available for some period at UTCC but has recently been expanded to give even more information. This is the program PROGLOOK which attaches any user program as a subtask, then interrupts this program at fixed increments of time, and plots the addresses of the interruptions in clearly readable histogram format. This resulting histogram can be used to 'tune' the program by finding heavily used areas of code and/or to find possible problem areas. This program was originally obtained from Stanford University.

The second program, OVERLAY, draws a 'flowchart' of any load module in overlay structure and clearly graphs all branches, segments, and paths. This can be an invaluable tool in debugging overlay modules since all CSECTS are concisely plotted. In addition, this program allows for the optional punching of the linkage editor control statements necessary to recreate the module. It can be a helpful 'insurance' program for those not too familiar with overlay work as well as a useful tool for the experienced programmer.

This program was originally written at the TIME/LIFE CORP. and was obtained by UTCC through the SHARE program library.

As stated, both programs will be defined in USERBOOK updates, but in the meantime interested users are urged to contact Herb Kugel at 928-7286.

PL/I CHECKOUT AND PL/I OPTIMIZING COMPILERS

S. Verscay

A tandem of two excellent IBM program products is now available to our growing group of dedicated PL/I programmers: the PL/I Checkout and the PL/I Optimizer.

Each of the two compilers is quite capable of executing a PL/I program. However, their purpose is distinct. Checkout should and usually will be used for debugging until the program is functioning properly. At this point the programmer will prefer to switch to Optimizer in order to reduce the execution costs. Ideally, of course, a load module will be created and saved to eliminate compilation and loading.

How do the execution costs compare with the PL/I level F compiler? To answer this question we ran a number of test jobs with a CPU-bound and an I/O-bound program.

	Compilation		Execution		Cost
	CPU	ERT	CPU	ERT	
CPU-bound Program					
Checkout	.04	.25	2.56	2.68	$62.20
Optimizer-OPT(0)	.07	.42	.09	.12	$6.14
OPtimizer-OPT(2)	.10	.61	.08	.12	$6.70
Level F-OPT=0	.06	.30	.15	.17	$7.22
Level F-OPT=1	.06	.33	.13	.15	$6.86
Level F-OPT=2	.07	.38	.13	.15	$7.18
I/O-bound Program					
Checkout	.03	.16	.25	.92	$5.85
Optimizer-OPT(0)	.07	.56	.11	.75	$6.42
Optimizer-OPT(2)	.09	.63	.11	.74	$6.26
Level F-OPT=0	.05	.32	.15	.73	$7.14
Level F-OPT=1	.05	.31	.14	.73	$6.58
Level F-OPT=2	.05	.34	.12	.74	$6.72

All times in the above figure are in minutes. CPU stands for CPU time and ERT stands for Equivalent Run Time. The high PL/I Checkout cost illustrates how this compiler should not be used, namely for production runs on cpu-bound jobs.

To invoke either of the two compilers, UTCC catalogued procedures PLI, PLIGO, PLILEGO, or PLILE may be used by specifying LEVEL=CHECK or LEVEL=OPT as shown below:

```
//  EXEC  PLIGO,LEVEL=CHECK,PARM.PLI=FORMAT
//PLI.SYSIN  DD  *
(PL/I program)
//GO.SYSIN  DD  *
(Data)
/*
```

Certain execution-time conditions, such as the upper limit of the number of statements to be executed, may be modified by means of keyword PARM.GO. If you are using procedure PLIGO, the parameter is constructed as follows:

```
PARM.GO='loader data/compiler data/user data'
```

For example, to limit the execution to 999 statements, PARM.GO='/step(999)' should be coded.

The new compilers have a number of PL/I language extensions not available in the PL/I level F compiler. We will briefly describe the DEFAULT statement, the interlanguage communication feature, and extended precision.

```
DEFAULT RANGE(*) FIXED BIN VALUE(FIXED BIN(31));
```

will make all variables in the program full word integers, unless declared otherwise.

A Fortran subroutine defined as

```
 SUBROUTINE MINV(N,za0
 DIMENSION A(20,20)
```

may be called from a PL/I program when declared as follows:

```
DCL MINV EXTERNAL ENTRY(FIXED BIN(31),(*,*) fLOAT)
OPTIONS(FORTRAN);
```

Variables with accuracy of up to 33 decimal digits may be declared as

```
DECLARE X FLOAT DEC(33); or
DECLARE X FLOAT BIN(109);
```

The syntax checking of both compilers is compatible, i.e., each compiler checks features implemented only by the other, but otherwise ignores them. Similarly, the object and the load modules produced by either Checkout or Optimizer may be freely intermixed. However, LEVEL=CHECK must be used when executing such a combination.

Aside from checking for undefined variables, subscriptrange and stringrange, the Checkout compiler will print the intermediate results of a computation in case of an error.

```
ON ERROR PUT ALL;
```

may be used to print the complete program status information, trace of the last ten statements executed, and the value of every variable in the program.

The complete control over the execution of user's program can be attributed to the Checkout Compiler's peculiar mode of execution. Where other compilers produce machine instructions, Checkout generates a stylised internal text stream which is later scanned and executed by an interpreting program loaded at execution. An error normally resulting in a system completion code will be indicated by the interpreter in programmer's terms rather than as a hexadecimal dump. Since PL/I Checkout interpreter is a rather large program it will not run efficiently in a small core region. REGION.GO=150K or larger is recommended.

During compilation itself, the compiler will be able to recognize and recover from cases of unbalanced or missing quotes, parentheses or comment delimiters in the program by backtracking to the last valid delimiter and reconstructing from there. Minor spelling or obvious keypunching errors will be flagged and the corrected keyword assumed in most instances. For example:

```
DEKLARE WORD CHARACTER VARY;
```

will be correctly interpreted as

```
DECLARE WORD CHARACTER VAR;
```

A commendable feature is formatting of source program to make it more legible and aesthetically pleasing. To use this feature, code PARM.PLI=FORMAT.

Optimization of a program is a never ending task, usually impossible to accomplish by software alone. A number of optimization features is available to Optimizer users, such as REDUCIBLE procedures, REORDER prefix in DO-loops, and CONNECTED parameters.

Attribute REDUCIBLE permits treating of function references with identical arguments as common. REORDER allows the compiler to move an invariant expression or statement outside the loop. Frequently used variables within the loop are kept in registers. CONNECTED attribute specifies elements of arrays or structures are in contiguous storage to allow optimization of parameter usage.

The compiler will generate shift instructions rather than multiplications or divisions by powers of 2, move character instruction rather than a loop when copying arrays, and it will abandon evaluation of logical expressions as soon as they are satisfied.

Two optimization levels are available. Core usage optimization is the default and PARM.PLI='OPT(TIME)' will request the optimization for time as well.

Both compilers are well documented in "OS PL/I Checkout and Optimizing Compilers: Language Reference Manual", even though the reader will occasionally feel the information in it is too laconic and will prefer to use the PL/I level F language reference manual. In addition there is a "Programmer's Guide" and a "Messages" manual available for both PL/I Checkout and for PL/I Optimizer.

UPDATES ISSUED FOR USERBOOK SECTION 3

J. Campbell

Pages added, and/or replaced by updates:

December 11/72 -- 3.2280 through 3.2280-11
Temporary Updates

December 11/72 --
3.4
3.4001
3.4020
3.4020-2
3.4020-3
3.4020-4
3.4120
3.4130
3.4150
3.4210
3.4220
3.4230
3.4240
3.4255
3.4270
3.4280
3.4285
3.4310
3.4315-2
3.4320
3.4330-4
3.4335
3.4335-2
3.4340
3.4340-2
3.4500-2

December 13/72 --
3.3
3.3-1
3.3060
3.3075
3.3090
3.3100
3.3105
3.3105-2
3.3105-3
3.3120
3.3120-2
3.3130
3.3220
3.3223
3.3226
3.3227
3.3228
3.3240
3.3240-2
3.3240-3
3.3240-4
3.3260
3.3260-2
3.3260-3
3.3260-4
3.3260-5
3.3260-6
3.3260-7

December 14/72 --
3.6410
3.6415
3.6420-2
3.6430
3.6440-2
3.6440-3
3.6450
3.6455
3.6460
3.6460-2
3.6460-3
3.6460-4
3.6460-5
3.6460-6
3.6490
3.6491-2
3.6491-3
3.6491-4
3.6491-5
3.6491-6
3.6491-7
3.6491-8
3.6492
3.6492-2
3.6492-3
3.6493
3.6493-2

December 15/72 --
3.6
3.6000
3.6006
3.6006-2
3.6018
3.6018-2
3.6020
3.6020-2
3.6100
3.6105
3.6110
3.610-2
3.6200
3.6205
3.6210
3.6210-2
3.6305
3.6310
3.6310-2
3.6400
3.6400-2
3.6410
3.6410-2
3.6500
3.6508-2
3.6510
3.6510-2
3.6600
3.6608-2
3.6610
3.6610-2
3.6700
3.6708-2
3.6710
3.6710-2

December 18/72 --
3.6710
3.6714
3.6725
3.6730
3.6790
3.6790-2

HSJS STATISTICS FOR DECEMBER

J. Lees

November again proved to be one of the heaviest months of the year, with December's production falling by 47.5% to 77,377 jobs.

The use of WATFIV continues to be heavy, comprising 54.2% of the total load. PL/C had been even with WATFIV all year but dropped to only 36.4% in December.

The types of jobs are:

WATFIV (W), ALGOL & SPITBOL (G), PL/C (C),
ASMG (A), LIST & WATBOL (L), SIMON (S).

WATBOL has just been added to the system and consequently the use has been very small.

```
ALL     JOB SUMMARY  ************  FOR 01-311272
    W      G      C      P      A      S      L     TOT TIME
   58      2     56      2     18      2      0     138  8+WC
  119      5    108      1      4      7      6     250   |WWCC
  213      1    188      0     17     24     15     458   |WWWWWCCCC
  231      5    235      1     13      9     19     513   |WWWWWCCCCC
  277      6    311      0     26      8     13     641  9+WWWWWWCCCCCCC
  320     21    332      0     29     10     14     726   |WWWWWWWWCCCCCCCC
  407      5    366      2     55     13     17     865   |WWWWWWWWWWCCCCCCCCCA
  506     12    399      0     55     24     28    1024   |WWWWWWWWWWWWCCCCCCCCCA
  529      4    326      0     54     18     13     944 10+WWWWWWWWWWWWWCCCCCCCCA
  698      6    402      1     69     18     22    1216   |WWWWWWWWWWWWWWWWWCCCCCCCCCCA
  718      6    396     20     58     28     33    1259   |WWWWWWWWWWWWWWWWWCCCCCCCCCA
  756     14    432      3     59     28     31    1323   |WWWWWWWWWWWWWWWWWWCCCCCCCCCCA
  928     10    502      3     53     32     33    1561 11+WWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCA
  961     14    529      2     48     25     22    1601   |WWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCA
 1051     13    606      5     61     15     38    1789   |WWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCA
 1028     14    620      1     80     23     47    1813   |WWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCAAL
  954     20    641      6     69     26     24    1740 12+WWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCA
  961      7    661      5     80     17     28    1759   |WWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCAA
  869     11    595      1     60     22     23    1581   |WWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCA
  888     18    687      8     60     12     45    1718   |WWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCAL
  932     15    692     11     71     27     51    1799 13+WWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCAL
 1059     12    660     10     58     18     47    1864   |WWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCAL
 1101     32    791      5     79     28     34    2070   |WWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCA
 1100     22    806      1     91     21     65    2106   |WWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCCAAL
 1121     27    709      6     90     30     52    2035 14+WWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCAAL
 1142     24    740      7     91     28     45    2077   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCAAL
 1152     19    764     23     94     15     43    2110   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCAAL
 1271     24    786     11     84     16     42    2234   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCAAL
 1213     18    771      7    107     24     62    2202 15+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCAAL
 1208     29    749     15    105     27     34    2167   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCAA
 1228     39    747     15    117     11     34    2191   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCAA
 1241     47    761     26    131     29     61    2296   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWGCCCCCCCCCCCCCCCCCCCAAAL
 1280     31    684     18    107     27     51    2198 16+WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCAAL
 1242     33    709      3     94     20     55    2156   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCAAL
 1199     29    741     16    116     12     58    2171   |WWWWWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCAAL
 1067     23    775     12    109     21     54    2061   |WWWWWWWWWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCCCCCCCAAL
  769     20    544     13     54     11     29    1440 17+WWWWWWWWWWWWWWWWWWWCCCCCCCCCCCCCA
  698      8    457      2     57      7     39    1268   |WWWWWWWWWWWWWWWWWCCCCCCCCCCCA
  743      6    441      1     62     18     38    1309   |WWWWWWWWWWWWWWWWWWCCCCCCCCCCCA
  613      3    429      2     61     10     12    1130   |WWWWWWWWWWWWWWWCCCCCCCCCCA
  539      2    436      1     43      5     12    1038 18+WWWWWWWWWWWWWCCCCCCCCCCA
  472      8    355      1     34      5     11     886   |WWWWWWWWWWWCCCCCCCC
  450      8    334      8     35      3     17     855   |WWWWWWWWWWWCCCCCCCC
  448      4    306      7     31      8     17     821   |WWWWWWWWWWWCCCCCCC
  448      2    269      9     60      4     11     803 19+WWWWWWWWWWWCCCCCCA
  485      5    313      7     51      9     17     887   |WWWWWWWWWWWWCCCCCCCA
  495      5    365      4     48     13     17     947   |WWWWWWWWWWWWCCCCCCCCCA
  556      3    398      1     61      4     14    1037   |WWWWWWWWWWWWWCCCCCCCCCA
  598      5    378      3     64      9     20    1077 20+WWWWWWWWWWWWWWCCCCCCCCCA
  627      9    354      1     47     16     19    1073   |WWWWWWWWWWWWWWWCCCCCCCCA
  585      9    339      1     48     17      9    1008   |WWWWWWWWWWWWWWCCCCCCCCA
  529      5    407      1     54     16     10    1022   |WWWWWWWWWWWWWCCCCCCCCCCA
  518      9    427      1     39     19     19    1032 21+WWWWWWWWWWWWCCCCCCCCCC
  453      7    405      1     61     14      8     949   |WWWWWWWWWWWCCCCCCCCCCA
  444     13    453      0     43     15     31     999   |WWWWWWWWWWWCCCCCCCCCCCA
  459     42    450      1     76     40     22    1090   |WWWWWWWWWWWGCCCCCCCCCCCAS
----- ------ ------ ------ ------ ------ ------ ------- 22+---------+---------+---------+---------+---------+---------+---------+
41975    792  28157    312   3552    960   1633   77377    0        400       800      1200      1600      2000      2400      2800
```

INTERACTIVE SYSTEMS RELIABILITY

S. Goldfarb

The following table summarizes the time lost out of scheduled hours of production for the period December 1 through December 31, 1972. Chilly December brought what appeared to be a rash of strange hardware and software errors. It was finally determined that the errors were a result of periods of low humidity in the machine room: some extremely cold, dry periods during December combined with a fault in the Air Conditioning/Humidifying Units to induce the hardware (and software) failures. Fortunately, all the failures were of short duration and only two of the failures occurred during the peak weekday hours of 9 am. - 5 pm. The total number of scheduled hours of operation during December was 439. There were no late starts (IPL's). The table below shows the time lost due to system failures for each system: seven unscheduled IPL's were required as a result of the failures. The uptime for each of APL, ATS and CPS was 99.70%, 99.66% and 99.60%, respectively. In addition to the scheduled hours of operation, APL, ATS and CPS were available during approximately 220 hours of unscheduled weekend and holiday time.

DATE	DOWN TIME (mins.)			REASON
	APL	ATS	CPS	
Tues. Dec. 12	7	9	15	*Undetermined
Sat. Dec. 17	9	10	11	*Humidity problems
Mon. Dec. 18	6	8	10	*" "
Mon. Dec. 18	17	18	19	*" "
Thur. Dec. 21	13	15	17	*" "
Wed. Dec. 27	13	14	15	*" "
Thur. Dec. 28	13	15	18	*" "
Totals	78	89	105	*IPL Required

System Failures December 1 to December 31, 1972

APL CONFERENCE

S. Goldfarb

APL enthusiasts are reminded of the APL V User's Conference planned for May 15 - 18, 1973 at the Inn on the Park in Toronto. Papers for this conference (or further enquiries) should be directed to the Program Chairman:

Mr. E. M. Edwards
Control Data Canada Limited
1855 Minnesota Court
Streetsville, Mississauga, Ontario

Phone: 270 - 1500 Ext. - 240

	ROOM	PHONE 928-
DIRECTOR		
John C. Wilson	49 St.Geo	6496
ASSISTANT DIRECTOR		
C. Alan Ford	49 St.Geo	2991
USER LIAISON OFFICER		
Bill Greene	SF128	2694
Information Office	SF115A	4990 or 4991
ADMINISTRATION MANAGER		
Jerry Palter	SF131	8948
AUTHORIZATION CLERKS		
Nancy Pocock (S/370 + 7094)	SF130	8702
Yvonne Davis (Interactive)	49 St.Geo	8703
S/370 SERVICES		
MANAGER		
Dave McNaughton	SF136	6281
INPUT/OUTPUT SUPERVISOR		
Derry Cox	SF112	7092
USER SERVICES SUPERVISOR		
Stan Yagi	SF112	7331
SYSTEMS SUPPORT SUPERVISOR		
Rein Mikkor	SF112	5058
PROGRAM ADVISORS	SF103	8599
INTERACTIVE TERMINAL SYSTEMS		
MANAGER		
Sam Goldfarb	49 St.Geo	3787
7094 SERVICES		
MANAGER		
Joyce Walton	BT1207	7094

JOB STATUS QUERIES:

SYSTEM/370	7373
7094	7094

INTERACTIVE TERMINAL SYSTEMS:

System Status	6234
APL	7200
ATS	7100
CPS	6200

CONVERSATIONAL REMOTE JOB ENTRY (CRJE)

2741: Tel: 7223 7381 7386

TTY: 7445

UTCC COMPUTER EQUIPMENT

(a) SYSTEM/370 MODEL 165

- located in SF 106/110/111
- provides General Purpose Job Stream, High Speed Job Stream and Conversational Remote Job Entry services
- 2048K bytes of core
- 1 drum
- 4 disk drives IBM (3330)
- 8 disk drives IBM (2314)
- 6 magnetic tape drives (4 9-track and 2 7-track)
- 6 display consoles
- 6 printers
- 5 card readers
- 1 card punch
- 7 remote batch terminals
- 1 paper tape reader
- CALCOMP plotter (11" and 30")

- OS/MVT with HASP

(b) SYSTEM/360 MODEL 65

- located in Room 333 McLennan Physical Laboratories
- provides Interactive Systems Service
- 1536K bytes of core
- 16 disk drives (2314)
- 2 9-track magnetic tape drives
- 1 printer
- 1 card reader
- 1 card punch
- 120 typewriter terminals

- OS/MVT with APL, ATS, and CPS

(c) 7094 II

- located in Room 1203 Burton Tower
- 32K words of core
- 1 disk
- 8 magnetic tape drives
- input/output via a 1401 computer

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